

If the estimate were made upon three hours instead of two per day, it is evident that the comparison would be still more in favour of the gas lights, since the interest of capital would be the same, and the wear and tear not much greater; so that the annual cost might be about 650*l.* instead of 3000*l.*

The introduction of the gas lights into this manufactory has been gradual: at first some inconvenience was experienced from the smell; but this objection has been wholly removed by improved methods of purifying the gas, and it is now much approved by the work-people for the perfect steadiness of the light; and it is wholly free from the inconvenience of snuffing, and from the danger occasioned by sparks that fall from candles.

In addition to the foregoing statement of comparative economy, the author conceives it may be interesting to the Society to be informed of the original application of this gas, as a substitute for oil and tallow, which he states to have put in practice nearly sixteen years, in consequence of experiments which he was at that time conducting at Redruth, in Cornwall, upon the distillation of various mineral and vegetable substances.

It was not, however, till the year 1798, that he removed from Cornwall to the manufactory of Messrs. Boulton and Watt, at the Soho foundery, and there constructed an apparatus on a large scale, for the purpose of lighting their principal building. Since that period it has been extended to the greatest part of their manufactory, to the exclusion of other artificial light; but Mr. Murdoch has preferred collecting his estimate from the apparatus of Messrs. Philips and Lee, on account of the greater extent and greater uniformity of the lights.

Although the author did not derive his information concerning the inflammability of this gas from any source but his own experiments, he has since learned that "the inflammable spirit of coals" is mentioned by Dr. Clayton in the forty-first volume of the *Philosophical Transactions*, so long since as the year 1739; and he is informed that the current of gas escaping from Lord Dundonald's tar-ovens had been frequently set on fire previous to the date of his experiments: but he thinks himself entitled to claim the original idea of applying it as an economical substitute for oils and tallow for the purpose of illumination.

Further Experiments on the Spleen. By Everard Home, Esq. F.R.S.
Read February 25, 1808. [*Phil. Trans.* 1808, p. 133.]

The author having established by the experiments which he lately communicated to the Society, that when the pylorus is closed by a ligature, fluids pass from the stomach into the circulation through the medium of the spleen, has since that time conducted a new course of experiments to determine whether there is the same passage also in the natural state of these parts.

Six asses were the subjects of as many experiments. To the three

first, tincture of rhubarb was given, to the quantity of a pint and a half in three doses of half a pint each, with the same quantity of water. The fourth and fifth had powdered rhubarb made into a bolus, and the sixth took three pints of infusion of rhubarb.

When the asses were killed, equal quantities of blood were taken from the splenic vein and from the left auricle of the heart, or from the vena cava, and suffered to coagulate, that the serum of each might be obtained for examination by alkalies, in comparison with each other, and with the urine of the animal, as well as with infusions of its spleen and of its liver in water.

In the first of the experiments with tincture of rhubarb, the infusion of the spleen had a tint of colour equal in intensity to that of sixty drops of tincture of rhubarb in two ounces of water; the serum from the blood of the splenic vein, to fifteen drops; the serum from the auricle, to three drops. The urine had so deep a tinge that it nearly resembled the pure tincture itself.

In the second and third experiments the results were nearly similar, but less intense. But in those asses to which the rhubarb boluses had been given without any fluid, the spleen was found in its contracted state, with cells scarcely visible, and without sensible impregnation by the rhubarb; but the cæcum and colon contained several quarts of fluid, in which the rhubarb was more evident both to sight and smell than in the stomach. The urine also was highly impregnated with the colour of the rhubarb. The effects from infusion of rhubarb were perfectly similar to those from the tincture, but the colours occasioned by it were not so intense.

In the course of these experiments, an attempt was made to ascertain whether the blood from the splenic vein contained more serum than that from other parts of the body; but the difference observable was not so great as it was afterwards found might be occasioned by other circumstances.

From the experiments contained in his former and present paper, Mr. Home considers it ascertained that the spleen is sometimes found distended to double the bulk which it occupies in its more contracted state.

In the distended state there is a cellular structure distinctly visible, but in the contracted state these cells cannot be seen without a magnifying-glass; the difference between these states depending upon the quantity of liquid that was contained in the stomach before death.

If the fluids contained in the stomach be coloured with tincture of rhubarb, the spleen and the blood in the splenic vein are coloured also, more strongly than the liver or blood contained in other veins of the body; so that the colour cannot arrive at the spleen through the ordinary course of the circulation. But when the stomach is kept without liquids, although the colouring matter be carried through the system to the urine by the ordinary channel, no particular evidence of it is to be met with in the spleen or its vessels; but the principal absorption takes place from the cæcum and colon. No vessels, however, have been discovered by which the communica-

tion between the stomach and spleen is carried on; but the evidence is too strong to leave a doubt on the mind of the author as to their existence.

Observations of a Comet, made with a View to investigate its Magnitude and the Nature of its Illumination. To which is added, an Account of a new Irregularity lately perceived in the apparent Figure of the Planet Saturn. By William Herschel, LL.D. F.R.S. Read April 7, 1808. [Phil. Trans. 1808, p. 145.]

Dr. Herschel presuming that the motion of the comet would be correctly ascertained at the Royal Observatory at Greenwich, confined his observations to its physical condition, and relates the several circumstances which he remarked concerning its nucleus, its head, its coma, and its tail. The form of its nucleus was particularly attended to on the 4th of October, and remarked to be perfectly circular and equally bright on all sides.

Its magnitude was at the same time estimated at about $3''$, due care being taken to determine that the visible disc was not spurious, by means described in a former paper. It was examined with a 10-feet reflector, and with powers of 200 and 300; but its light was not found sufficient to bear higher powers.

On the 19th at $5^h 40'$ it was again estimated at $2\frac{3}{4}''$, but at $6^h 20'$ it was compared with Jupiter's third satellite, and found to be rather less than it.

The coma or nebulous appearance surrounding the head was at the same time estimated at about six minutes, and on the 6th of December at $4^h 45'$.

The tail on the 18th of October measured $3\frac{3}{4}'$, but on the 6th of December it was reduced to $23'$. The tail was at various times observed to appear longer and more distinct on the south preceding, than on the north following, side.

Various authors having said that the tails of comets were so rare as not to affect the light of the smallest stars seen through them, Dr. Herschel paid particular attention to that circumstance; but uniformly found those stars which he saw emerge from behind the tail to become brighter than before in comparison to neighbouring stars.

On the 6th of December the head had the appearance of a large brilliant round nebula, suddenly much brighter in the centre. On the 1st and 14th of January it had still more the appearance of a nebula, with an increase of brightness in the middle; but even so late as the 21st of February, the nebulosity was observed to project a little on that side where the tail used to be seen.

The inferences which Dr. Herschel draws from these observations, are, first, that the body of the comet consists of solid matter about 538 miles in diameter; secondly, that since the portion of its visible hemisphere which could be illuminated by the sun on the 4th of October did not exceed 120° , and since it did not appear gibbous but perfectly circular, the surface of the comet must itself be luminous,